July 29, 1952 C. A. SHIVODER, JR 2,604,923

APPARATUS FOR ASSEMBLING ARTICLES

Filed Jan. 20, 1950 2 SHEETS—SHEET 1

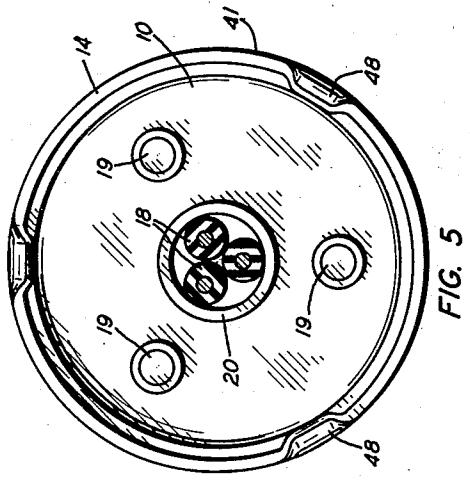


FIG. 5

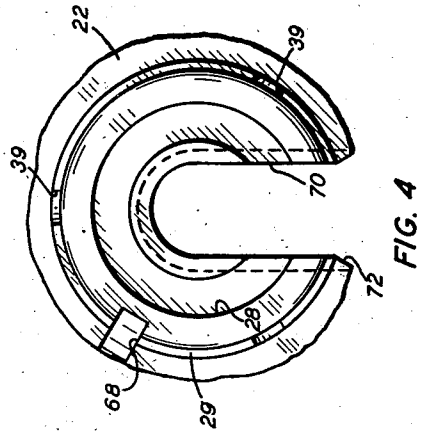


FIG. 4

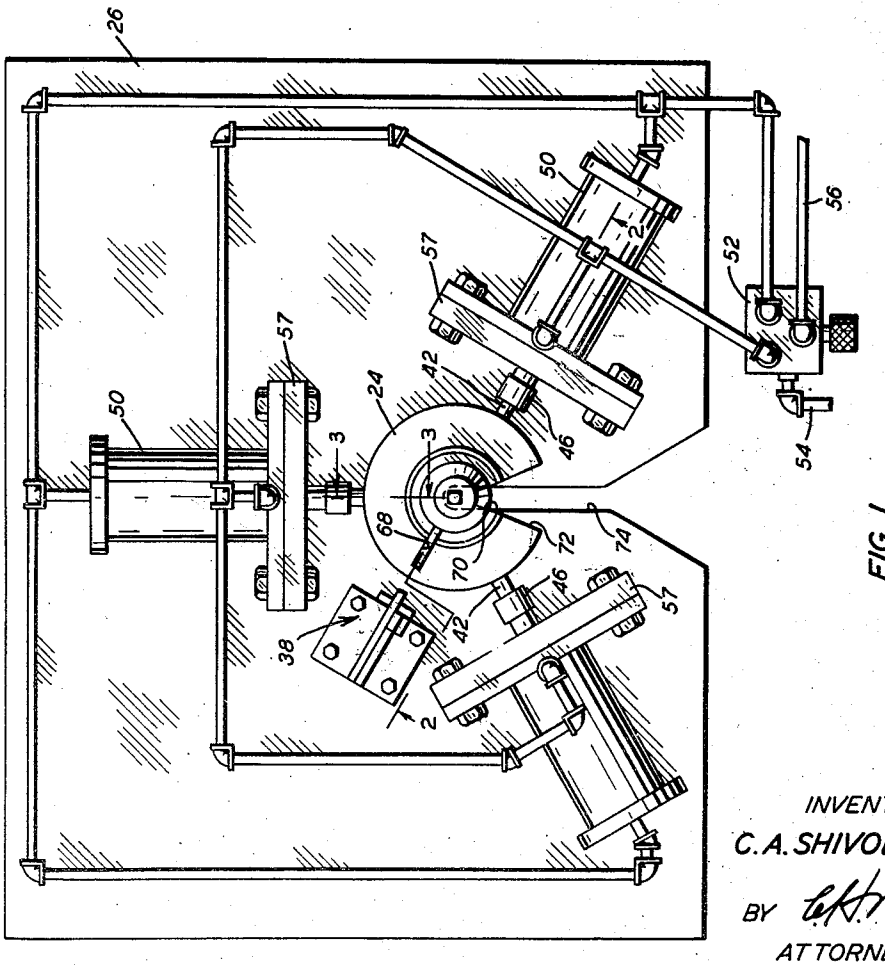


FIG. 1

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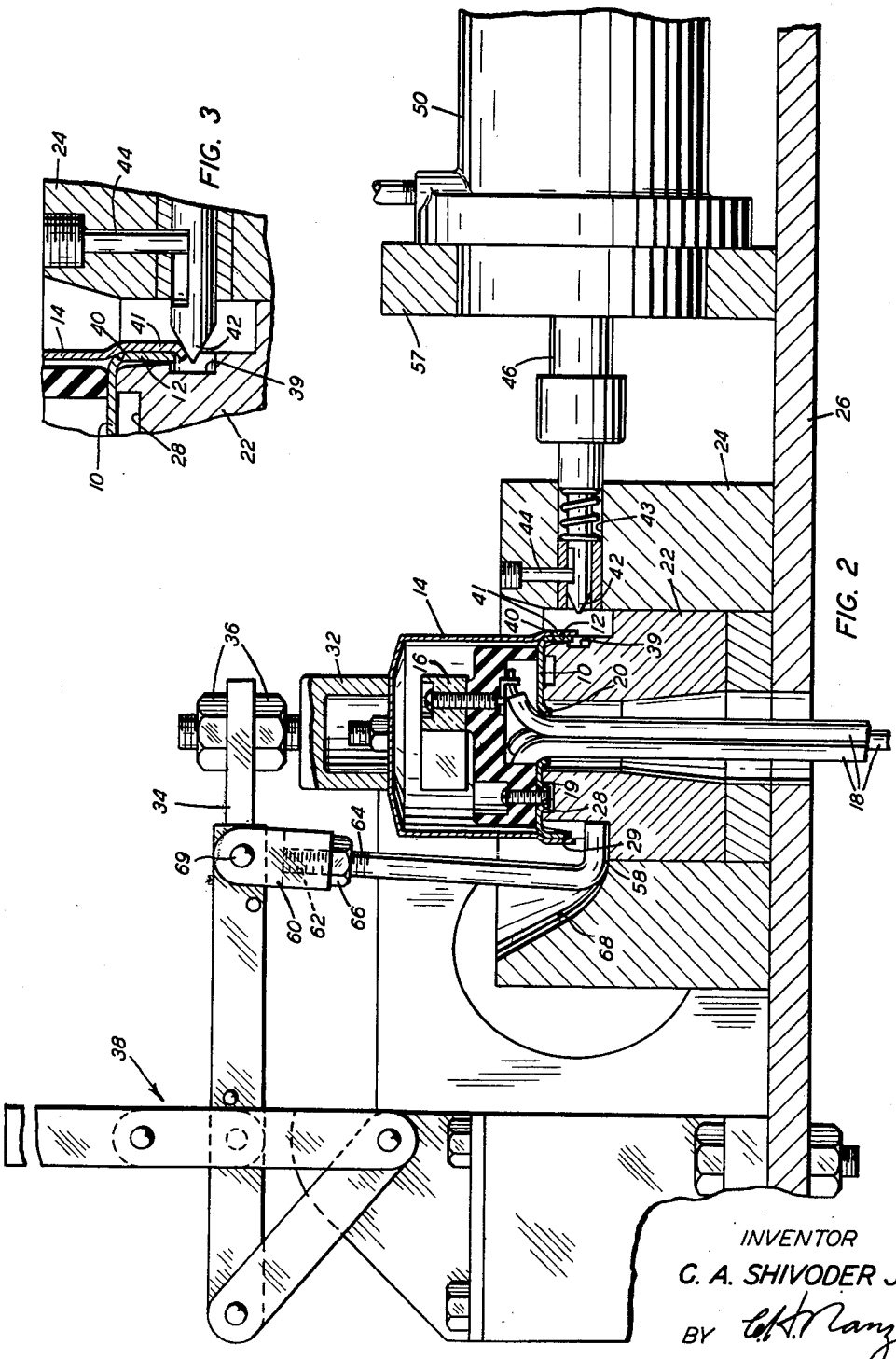


FIG. 2

FIG. 3

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APPARATUS FOR ASSEMBLING ARTICLES

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4 Claims. (Cl. 153—21)

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This invention relates to apparatus for assembling articles and more particularly to apparatus for crimping cup-shaped covers on bases.

In certain types of communication equipment, conductors are connected to an element, such as a resistor, a fuse, or the like, mounted on a supporting base and enclosed in a housing crimped to the base. In the past, it has been difficult to crimp the housing to secure it to the base because the conductors running to the outside of the base interfered with normal assembling operations.

An object of the invention is to provide new and improved apparatus for assembling articles.

A further object of the invention is to provide new and improved apparatus for assembling cup-shaped articles on bases.

Another object of the invention is to provide new and improved apparatus for crimping cup-shaped covers to bases having conductors extending from the bases.

An apparatus illustrating certain features of the invention may include means for supporting one of a pair of interfitting elements and means for pressing the other of the elements into interfitting engagement with an element supported by the element-supporting means. There also is provided means for swaging the second-mentioned element to secure it to the first-mentioned element.

A complete understanding of the invention may be obtained from the following detailed description of an apparatus forming a specific embodiment thereof, when read in conjunction with the appended drawings, in which:

Fig. 1 is a fragmentary, top plan view of an apparatus forming one embodiment of the invention;

Fig. 2 is an enlarged, fragmentary, vertical section taken along line 2—2 of Fig. 1;

Fig. 3 is an enlarged, fragmentary, vertical section taken along line 3—3 of Fig. 1;

Fig. 4 is an enlarged, fragmentary, top plan view of a portion of the apparatus shown in Fig. 1, and

Fig. 5 is an enlarged, bottom plan view of an article assembled by the apparatus shown in Fig. 1.

Referring now in detail to the drawings, there is shown in Figs. 1, 2, 3 and 4 an apparatus for assembling a cup-shaped base 10 having a flange 12 and a cup-shaped protecting and mounting housing 14, after a protector 16 connected to conductors 18—18 extending through an opening 20 in the base has been secured to the base by bolts 19—19. An arcuate anvil 22 mounted in an arcuate holder 24 connected to a table top 26 is

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provided with an arcuate groove 28 to provide clearance for the ends of the bolts 19—19. The anvil is provided with a shoulder 29 extending therearound to support the edge of the flange 12 of the base. A cup-shaped presser 32 secured adjustably to an arm 34 by nuts 36—36 may be pressed against the housing 14 by a manually operable toggle-joint linkage 38 to press a shoulder 40 on the housing 14 against the base 10, in which position a flange 41 of the housing 14 extends beyond the flange 12 of the base. The toggle-joint linkage is of the overcenter latching type, and is designed to latch in the pressing position. The anvil is also provided with clearance recesses 39—39.

Spring-retractable, chisel-shaped, crimpers 42—42 slidable in bores 43—43 in the holder 24 and keyed by keys 44—44 may be forced by pistons 46—46 into engagement with the flange 41 of the housing 14 to form crimped portions 48—48 in the flange 41 to lock the housing to the base 10. The pistons 46—46 are actuated by compressed air supplied to cylinders 50—50 through a manually operable, four-way valve 52 connected to a pipe 54 leading to source of fluid under pressure and an exhaust pipe 56. The cylinders are bolted to mounting plates 57—57 projecting from the table 26.

A hook 58 (Fig. 2) is carried by the arm 34 of the toggle-joint linkage 38 through a clevis 60 to which the hook is adjustably secured by a tapped bore 62 formed in the clevis, a threaded portion 64 of the hook and a lock nut 66. A guide surface 68 guides the hook into a position slightly below the flange 41 of the housing 14 when the cup-shaped presser 32 is moved into pressing engagement with the housing 14 which happens when the arm 34 is moved to the position in which it is shown in Fig. 2. In this position of the arm 34, a pin 69 connecting the clevis 60 to the arm 34 is slightly to the right of the center of gravity of the hook and the clevis, as viewed in Fig. 2. Hence, when the toggle-joint linkage 38 is actuated to swing the arm 34 in a counterclockwise direction, the hook 58 catches on the housing 14, and lifts the housing and the base 10 off the arcuate anvil 22 to facilitate removal of the assembled article from the apparatus. This may be done by moving the conductors 18—18 laterally through slots 70, 72 and 74 formed in the arcuate anvil 22, the holder 24 and the table 26, respectively.

Operation

With the base 10 above the upper surfaces of the holder 24 and the anvil 22, as viewed in Fig.

2, and the cup-shaped presser 32 retracted, the conductors 18—18 are moved laterally through the slots 70, 72 and 74 (Fig. 1) formed in the anvil, the holder and the table top 26 until the base 10 is directly over the anvil. The base then is slid over the anvil to the position thereof shown in Fig. 2, and the housing 14 is placed on the base. The toggle-joint linkage 38 is operated manually to press the housing tightly down on the base and is latched automatically in position to hold the housing and the base in correct positions for crimping. Both the top of the anvil and the shoulder 29 thereon engage and support the base against the force of the housing pressed against the base.

The valve 52 is actuated manually to supply air under pressure to the outer ends of the cylinders 50—50 and exhaust the air from the inner ends of the cylinders. This actuates the crimpers 42—42 through the pistons 46—46 to force the crimpers into engagement with the flange 41 of the housing 14 to permanently deform the engaged portions of the flanges 41 and 12 in interlocking positions in which the flange 41 extends over the flange 12 of the base 10. The valve 52 then is actuated to cause retraction of the pistons 46—46, and the crimpers 42—42 are spring-retracted away from the housing 14 to provide clearance for removal of the assembled article.

The toggle-joint linkage 38 is actuated manually to swing the presser 32 away from the housing 14. This catches the hook 58 on the housing 14, and lifts the housing and the base 10 from the anvil 22. After the housing and the base have been lifted from the anvil 22, the housing falls away from the hook, and the hook and the presser are moved to positions providing clearance for removal of the article. The article then is removed by moving the conductors 18—18 laterally through the slots 70, 72 and 74 while the base 10 and the housing 14 are maintained in positions elevated with respect to the anvil 22 and the holder 24. The apparatus then may be used to assemble another base and housing.

The above-described apparatus is simple and inexpensive in construction and operation, and is highly efficient and rapid in assembling and removing articles. The apparatus locks the housing 14 to the base 10 at several points so that the joint formed therebetween is very tight and positive, and does so in a single crimping operation.

What is claimed is:

1. An apparatus for fastening housings to bases having conductors and projections secured thereto, which comprises an arcuate anvil having a groove therein providing clearance for projections on a base which may be seated thereon, an arcuate holder disposed around the anvil and provided with guide passages extending radially toward the anvil, a plurality of crimpers mounted slidably in the guide passages in the holder, said holder and said anvil having aligned slots to permit conductors secured to a base to be moved laterally through the slots while the base is being seated upon the anvil, a presser movable toward and away from the anvil for pressing a housing over a base seated on the anvil, a hook carried by the presser, means for guiding the hook so that it may engage and remove a base from the anvil when the presser is moved away from the base, and means for actuating the crimpers to lock the housing to the base.

2. An apparatus for fastening housings to bases having conductors and projections secured thereto, which comprises an arcuate anvil having a groove therein for providing clearance for projections on a base which may be seated thereon, an arcuate sleeve disposed around the anvil and provided with guide passages therein, a plurality of crimpers mounted slidably in the guide passages in the sleeve, said sleeve and said anvil having aligned slots for permitting conductors secured to a base to be moved laterally through the slots while the base is being seated on the anvil, a presser movable toward the anvil for pressing a housing over a base seated on the anvil and also movable away from the anvil for freeing the housing, means for actuating the crimpers to lock the housing to the base, and means responsive to movement of the presser for moving a fastened housing and base off the anvil when the presser is moved away from the anvil.

3. An apparatus for fastening housings to bases, which comprises an anvil for receiving a base thereon, a presser positioned above and movable toward and away from the anvil for pressing a housing over a base positioned on the anvil, a hook pivotably suspended from the presser for engaging and removing a fastened housing and base from the anvil when the presser is moved away from the anvil, means for guiding the hook to a position under the base when the presser is moved toward the anvil, and means for locking the housing to the base.

4. An apparatus for fastening a housing to a base having elongated projections protruding from the bottom thereof, which comprises an anvil upon which a base may be seated, said anvil having a slot through which projections may be moved laterally while the base is being seated upon the anvil, a presser movable toward and away from the anvil for pressing a housing against a base seated on the anvil, a plurality of crimpers spaced about the anvil and movable toward and away from the base seated thereon, means for simultaneously actuating the crimpers to fasten a housing to the base, and means responsive to the pressing means for unseating a fastened housing and base from the anvil when the presser is moved away therefrom.

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